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10/661,564	09/15/2003	Kyoichi Suguro	03180.0333	8012

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Finnegan, Henderson, Farabow,
Garrett & Dunner, L.L.P.
1300 I Street, N.W.
Washington, DC 20005-3315

EXAMINER	
COLEMAN, WILLIAM D	
ART UNIT	**PAPER NUMBER**
2823	

DATE MAILED: 03/02/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/661,564	Applicant(s) SUGURO ET AL.	
	Examiner W. David Coleman	Art Unit 2823	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on 15 September 2003.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) 1-34 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) 1-34 is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date 09/03.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

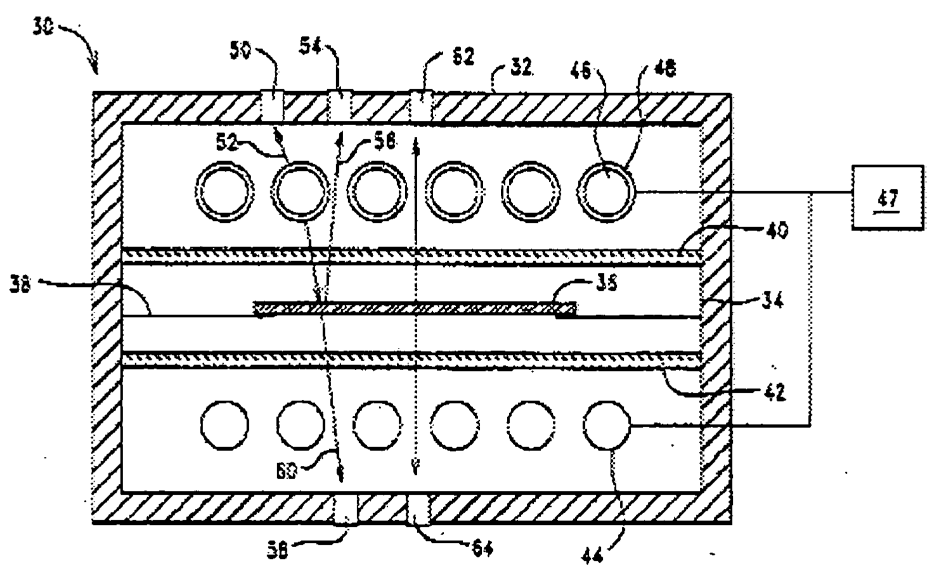
Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-34 are rejected under 35 U.S.C. 102(e) as being anticipated by Timans et al., U.S. Patent Application Publication U.S. No.: US2004/0149715 A1.

Timans discloses an annealing furnace and manufacturing apparatus as claimed. Please see **FIGS. 1-20** where Timans teaches the claimed limitations.



3. Pertaining to claim 1, Timans teaches an annealing furnace, comprising:

a processing chamber **30** configured to store a substrate **36**;

a susceptor **38** located in the processing chamber so as to load the substrate and having an auxiliary heater (lower lamps) for heating the substrate at 650 °C or less [0011], the susceptor having a surface being made of quartz (column 6, lines 25-30);

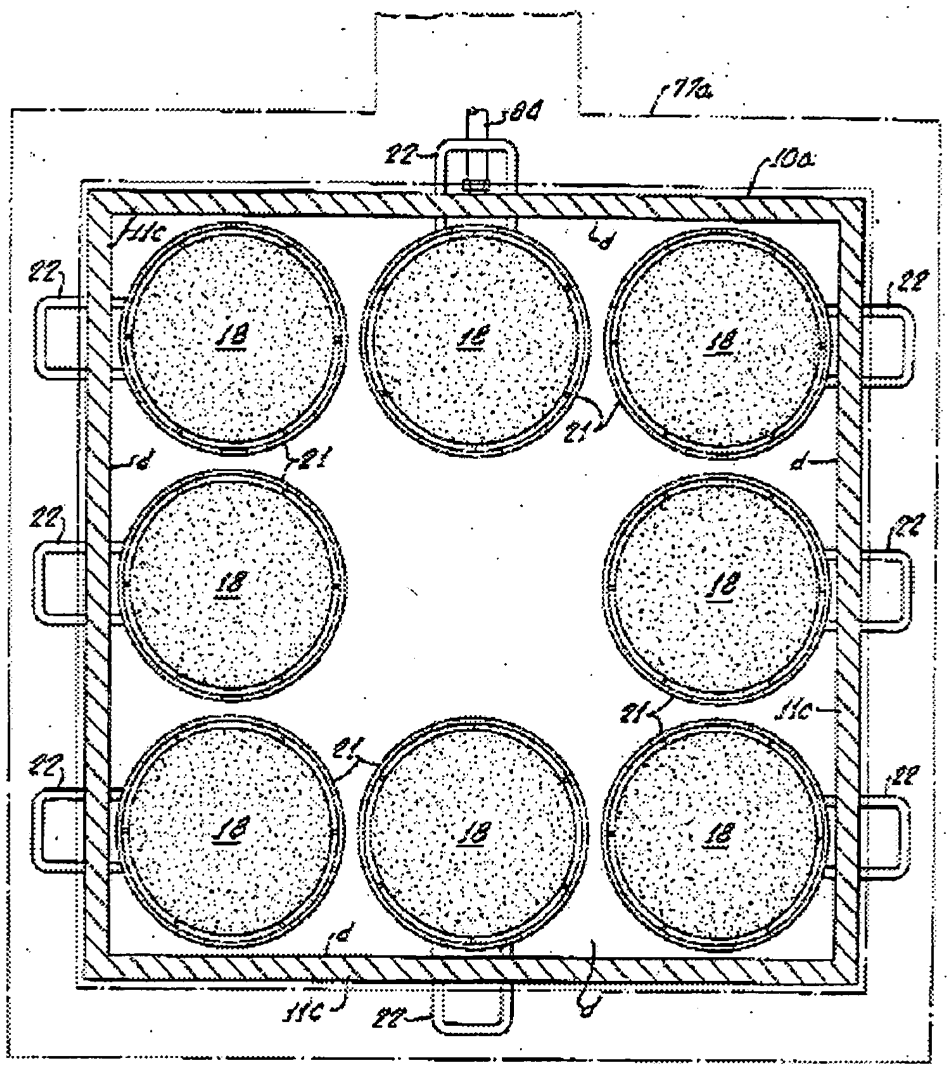
a gas supply system **24** configured to supply a gas required for a thermal processing on the substrate in parallel to a surface of the substrate;

a transparent window located on an upper part of the processing chamber facing the susceptor;

and a main heater **15/16** configured to irradiate a pulsed light (column 1, lines 18-20) on the surface of the substrate to heat the substrate from the transparent window, the pulsed light having a pulse duration of approximately 0.1 ms to 200 ms (column 4, line 4, which is within the claimed range) and having a plurality of emission wavelengths (i.e., spectrum, column 3, line 62).

4. Pertaining to claim 2, Timans teaches the annealing furnace of claim 1, wherein the main heater is one of a flash lamp and a laser unit having a plurality of laser sources for irradiating with a light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2 [0029].

5. Pertaining to claim 3, Timans teaches the annealing furnace of claim 1, wherein the gas supply system supplies at least one of an oxidation gas and a nitridation gas for forming an insulating film on the substrate (this limitation is shown in Sheets, U.S. Patent 4,698,486, which is incorporated by reference, **FIG. 7**, discloses a pipe **84**, which supplies oxygen or nitrogen, see claim 36 of Sheets, also see Timans paragraph 0165 and 0166).



6. Pertaining to claim 4, Timans teaches the annealing furnace of claim 1, wherein the emission wavelengths include ultraviolet components (it is well known that an excimer laser emits in the ultraviolet range [0025]).

7. Pertaining to claim 5, Timans teaches the annealing furnace of claim 3 , wherein the gas supply system supplies one of a reduction gas and a gas containing halogen for removing a native oxide film formed on the substrate prior to supplying one of the oxidation gas and the nitridation gas [0169].

8. Pertaining to claim 6, Timans teaches a manufacturing apparatus, comprising:

a first cassette chamber to place a wafer cassette for storing a substrate;

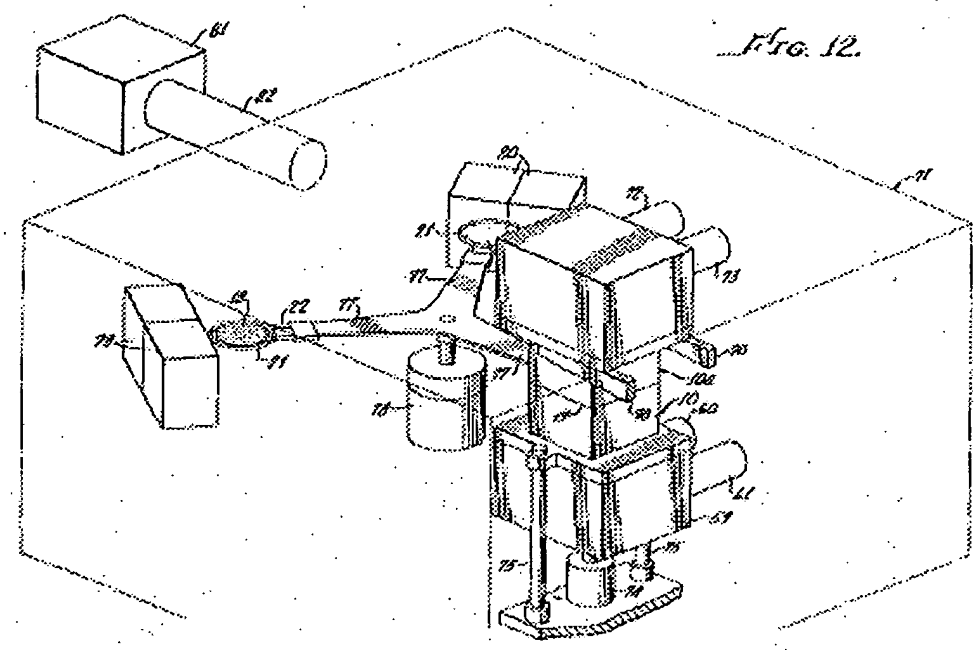
a transfer chamber connected to the first cassette chamber, having a transfer robot for transferring the substrate;

a first processing apparatus having a first processing chamber connected to the transfer chamber and configured to store the substrate, a first susceptor located in the first processing chamber so as to load the substrate transferred by the transfer robot, a first introduction conduit supplying a first gas to a surface of the substrate, a first transparent window located on an upper part of the first processing chamber, and a first

main heater irradiating a pulsed light on the surface of the substrate to heat the substrate from the first transparent window, the pulsed light having a duration of approximately 0.1 ms to 200 ms and having a plurality of emission wavelengths; and

a second cassette chamber to place another wafer cassette storing the substrate transferred from the first processing apparatus by the transfer robot (see FIG. 12 of Sheets).

FIG. 12.



9. Pertaining to claim 7, Timans teaches the manufacturing apparatus of claim 6 , wherein the first main heater irradiates with a light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2.

10. Pertaining to claim 8, Timans teaches the manufacturing apparatus of claim 6, wherein the first introduction conduit supplies at least one of an oxidation gas and a nitridation gas as the first gas for forming a first insulating film on the substrate.

11. Pertaining to claim 9, Timans teaches the manufacturing apparatus of claim 6, further comprising:

a second processing apparatus having a second processing chamber connected to the transfer chamber and configured to store the substrate, a second susceptor located in the second processing chamber so as to load the substrate transferred by the transfer robot, a second introduction conduit supplying a second gas to the surface of the substrate, a second transparent window located on an upper part of the second processing chamber, and a second main heater irradiating a light on the surface of the substrate to heat the substrate from the second transparent window and having a plurality of emission wavelengths.

12. Pertaining to claim 10, Timans teaches the manufacturing apparatus of claim 9 , wherein the second main heater irradiates the light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2.

13. Pertaining to claim 11, Timans teaches the manufacturing apparatus of claim 9, wherein the introduction conduit supplies at least one of an oxidation gas and a nitridation gas for forming a second insulating film on the substrate.

14. Pertaining to claim 12, Timans teaches the manufacturing apparatus of claim 6 , wherein the emission wavelengths of the first main heater include ultraviolet components.

15. Pertaining to claim 13, Timans teaches the manufacturing apparatus of claim 12, wherein the first introduction conduit supplies one of a reduction gas and a gas including halogen as the first gas for removing a native oxide film formed on the substrate.

16. Pertaining to claim 14, Timans teaches an annealing method, comprising:

introducing at least one of an oxidation gas and a nitridation gas to a substrate loaded on a susceptor in a processing chamber; and heating a surface of the substrate with a pulse duration of approximately 0.1 ms to 200 ms to perform at least one of oxidation and nitridation.

17. Pertaining to claim 15, Timans teaches the annealing method of claim 14, wherein the heating is performed by irradiation of a light having an irradiation energy density in a range of approximately 5 J/cm^2 to 100 J/cm^2.

18. Pertaining to claim 16, Timans teaches the annealing method of claim 15, wherein the irradiation of the light is performed for a plurality of times.

19. Pertaining to claim 17, Timans teaches the annealing method of claim 15, wherein emission wavelengths of the light includes ultraviolet components.

20. Pertaining to claim 18, Timans teaches the annealing method of claim 17, wherein the heating is performed after removing a native oxide film on the substrate by use of one of a reduction gas and a gas including halogen prior to the introduction of at least any one of the oxidation gas and the nitridation gas.

21. Pertaining to claim 19, <u>Timans</u> teaches the annealing method of claim 14, wherein the surface of the substrate is heated to a temperature range of approximately 350 °C to 1200 °C when measured by a pyrometer [0027].

22. Pertaining to claim 20, <u>Timans</u> teaches the annealing method of claim 14 , wherein the heating is selectively performed by aligning a stencil mask having an opening on an upper side of the substrate (because Timans also discloses forming silicide contacts with the claimed apparatus, it is well known to provide a stencil having openings to form the silicide contacts [0171]).

23. Pertaining to claim 21, <u>Timans</u> teaches the annealing method of claim 14 , wherein the heating is performed by doping one of halogen, oxygen and nitrogen to a portion of the substrate.

24. Pertaining to claim 22, <u>Timans</u> teaches a manufacturing method of an electronic device, comprising:

cleaning a substrate by a wet processing (RCA cleaning is well known in the art and cleaning a semiconductor substrate prior to a fabrication step is well known);

loading the substrate on a first susceptor in a first processing apparatus;

introducing a first gas to the substrate loaded on the first susceptor; and

performing a first processing of at least one of oxidation and nitridation by heating a surface of the substrate with a pulse duration of approximately 0.1 ms to 200 ms.

25. Pertaining to claim 23, <u>Timans</u> teaches the manufacturing method of claim 22, wherein the heating of the first processing is performed by irradiating a first light having an irradiation energy density of approximately 5 J/cm^2 to 100 J/cm^2.

26. Pertaining to claim 24, <u>Timans</u> teaches the manufacturing apparatus of claim 22, wherein the first processing is to form a first insulating film by use of at least one of an oxidation gas and a nitridation gas as the first gas.

27. Pertaining to claim 25, <u>Timans</u> teaches the annealing method of claim 23, wherein the irradiation of the first light is performed for a plurality of times.

28. Pertaining to claim 26, <u>Timans</u> teaches the manufacturing method of claim 22, wherein the surface of the substrate is heated to a temperature range of approximately 950 °C to 1200 °C when measured by a pyrometer.

29. Pertaining to claim 27, <u>Timans</u> teaches the manufacturing method of claim 22, further comprising:

loading the substrate, which has been subjected to the first processing, on a second susceptor in a second processing apparatus;

introducing a second gas to the substrate loaded on the second susceptor; and performing a second processing by heating the surface

of the substrate (please note that the Examiner takes the position that since another chamber is used in the fabrication process, i.e., ion implantation, the annealing chamber is used to activate the dopants and/or grow oxides/nitrides).

30. Pertaining to claim 28, <u>Timans</u> teaches the manufacturing method of claim 27, wherein the heating of the second processing is performed by irradiating a second light with a pulse duration of approximately 0.1 ms to 200 ms having an irradiation energy density of approximately 5 J/cm^2 to 100 J/cm^2.

31. Pertaining to claim 29, <u>Timans</u> teaches the manufacturing method of claim 27, wherein the second processing is to form a second insulating film by use of at least any one of an oxidation gas and a nitridation gas as the second gas.

32. Pertaining to claim 30, <u>Timans</u> teaches the manufacturing method of claim 28, wherein the irradiation of the second light is performed a plurality of times.

33. Pertaining to claim 31, <u>Timans</u> teaches the manufacturing method of claim 23, wherein emission wavelengths of the first light include ultraviolet components.

34. Pertaining to claim 32, <u>Timans</u> teaches the manufacturing method of claim 31, wherein the first processing is to remove a native oxide film on the substrate by use of one of a reduction gas and a gas containing halogen as the first gas.

Pertaining to claim 33, Timans teaches the manufacturing method of claim 27, wherein the surface of the substrate is heated by an irradiation of a second light to a temperature range of approximately 950 °C to 1200 °C when measured by a pyrometer.

35. Pertaining to claim 34, Timans teaches the manufacturing method of claim 32, wherein the heating of the second thermal processing is performed by the irradiation from a main heater having a plurality of emission wavelengths.

Conclusion

36. Any inquiry concerning this communication or earlier communications from the examiner should be directed to W. David Coleman whose telephone number is 571-272-1856. The examiner can normally be reached on Monday-Friday 9:00 AM-5:30 PM.

37. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Olik Chaudhuri can be reached on 571-272-1855. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

38. Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

W. David Coleman
Primary Examiner
Art Unit 2823

WDC